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“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 3723-3 (1983): Capacitors for Radio Interference Suppression, Part 3: Type FCRS 2 [LITD 5: Semiconductor and Other Electronic Components and Devices]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”



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Indian Standard



# SPECIFICATION FOR CAPACITORS FOR RADIO INTERFERENCE SUPPRESSION

## PART 3 TYPE FCRS 2

**0. General** — This standard shall be read in conjunction with IS : 3723 (Part 1)-1978 'Capacitors for radio interference suppression: Part 1 General requirements and methods of tests (*first revision*)'.

**1. Outline Drawing and Dimensions** — The outline drawing and dimensions shall be in accordance with Fig. 1 and Table 1.

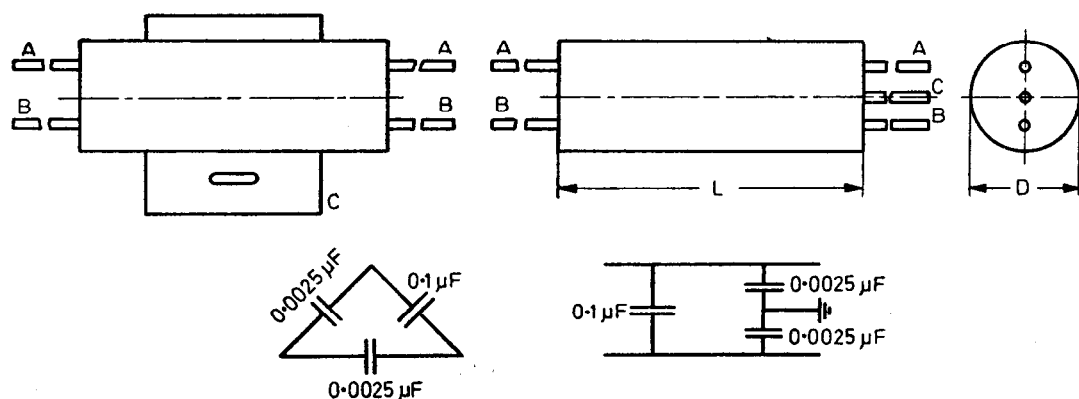


FIG. 1 OUTLINE DRAWING AND DIMENSIONS

TABLE 1 DIMENSIONS

| SI<br>No. | Capacitance Value            |                                      | Dimensions<br>mm        |
|-----------|------------------------------|--------------------------------------|-------------------------|
|           | X Section<br>( between A-B ) | Y Section<br>( between A-E and B-C ) |                         |
| (1)       | (2)                          | (3)                                  | (4)                     |
| i)        | 0.05 mF                      | $2 \times 2\,500\text{ pF}$          | $D \times L$<br>15 × 42 |
| ii)       | 0.1 mF                       | $2 \times 2\,500\text{ pF}$          | 19 × 42                 |
| iii)      | 0.15 mF                      | $2 \times 2\,500\text{ pF}$          | 19 × 42                 |

Adopted 9 March 1983

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## IS : 3723 (Part 3)-1983

### 2. Characteristics

|                                               |                                        |
|-----------------------------------------------|----------------------------------------|
| a) Capacitance value                          | : As specified in Table 1              |
| b) Selection tolerance                        | : $\pm 10$ percent $\pm 20$ percent    |
| c) Rated voltage                              | : 250 V ac                             |
| d) Rated current ( of the central conductor ) | : 6.3 A                                |
| e) Vibration                                  | : 10 to 2 000 Hz; 150 m/s <sup>2</sup> |
| f) Bump                                       | : 4 000 Bumps                          |
| g) Shock ( impact )                           | : 1 km/s <sup>2</sup>                  |
| h) Acceleration steady state                  | : 1 km/s <sup>2</sup>                  |
| j) Tangent of loss angle                      | : < 0.01                               |
| k) Insulation resistance                      | : > 30 000 M $\Omega$                  |
| m) Resonance frequency                        | : As specified below:                  |

| Capacitance Value  | Resonance Frequency |       |
|--------------------|---------------------|-------|
|                    | MHz                 |       |
|                    | $C_x$               | $C_y$ |
| 0.05 mF+2×2 500 pF | 4                   | 17    |
| 0.1 mF+2×2 500 pF  | 3                   | 17    |
| 0.15 mF+2×2 500 pF | 2.2                 | 17    |

|                        |              |
|------------------------|--------------|
| n) Insertion loss      | : 30 dB, Min |
| p) Classified category | : 40/85/21   |

### 3. Constructional Details

**3.1** These capacitors are classified as *X-Y* combination interference suppression capacitors and are mainly used in electrical equipment and appliances for eliminating radio interference. These capacitor are manufactured by using polyethylene teraphthalate (polyester) or paper dielectric with aluminium foil as electrode. The capacitors are encapsulated in metallic case. The lead configuration is brought out depending upon the customers requirements. Brackets are provided for earth terminal connections if required.

**4. Marking** — See 7 of IS : 3723 ( Part 1 )-1978.

**5. Classification of Tests** — See 8.1 of IS : 3723 ( Part 1 )-1978.

**6. General Conditions of Tests and Methods of Tests** — See 8.2 of IS : 3723 ( Part 1 )-1978.

**6.1 Schedule of Type Tests** — The test schedule and the specification requirements shall be in accordance with Table 2.

TABLE 2 TEST SCHEDULE AND REQUIREMENTS

(Clause 6.1)

| SI No.<br>(1)                           | Test<br>(2)                         | Clause Ref<br>in IS 3723<br>( Part 1 )-1978<br>(3) | Conditions<br>of<br>Test<br>(4)                               | Requirement<br>(5)                                                                               |
|-----------------------------------------|-------------------------------------|----------------------------------------------------|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| i) <i>Group 0</i><br><i>All Samples</i> |                                     |                                                    |                                                               |                                                                                                  |
| a)                                      | Visual examination                  | 8.4.1                                              | —                                                             | The workmanship and finish shall be satisfactory. The marking shall be legible.                  |
| b)                                      | Dimensions                          | 8.4.2                                              | —                                                             | The dimensions shall be as specified in Table 1.                                                 |
| c)                                      | Capacitance                         | 8.3.2                                              | —                                                             | The capacitance value shall correspond with rated capacitance taking into account the tolerance. |
| d)                                      | Tangent of loss angle               | 8.3.3                                              | —                                                             | Shall be not greater than 0.01.                                                                  |
| e)                                      | Voltage proof test                  | 8.3.1                                              | At twice the rated voltage                                    | There shall be no breakdown or flash-over.                                                       |
| f)                                      | Insulation resistance               | 8.3.4                                              | —                                                             | Shall be greater than 30,000 M $\Omega$ .                                                        |
| g)                                      | Radio frequency characteristics     | 8.6.4                                              | —                                                             | Minimum 30 dB insertion loss.                                                                    |
| h)                                      | Sealing                             | 8.6.1                                              | As per IS : 9000-<br>( Part 15/Sec 3 )<br>1982*               | There shall be no evidence of leakage.                                                           |
| ii) <i>First Group</i>                  |                                     |                                                    |                                                               |                                                                                                  |
| a)                                      | Robustness of termination           | 8.4.3                                              | As per IS:9000<br>( Part 19/Sec 1 to 4 )-<br>1978*            | There shall be no damage. The change in capacitance value shall be less than $\pm 2$ percent     |
| b)                                      | Vibration                           | 8.4.5                                              | As per IS : 9000<br>( Part 8 )-1981*                          | There shall be no damage. The change in capacitance value shall be less than $\pm 2$ percent.    |
| c)                                      | Solderability                       | 8.4.4.1                                            | As per IS : 9000<br>( Part 18 )-1981*                         | The termination shall get wet easily and the tinning shall be uniform and good.                  |
| d)                                      | Bump                                | 8.4.6                                              | 4,000 Bumps<br>As per IS : 9000<br>( Part 7/Sec 2 )-<br>1979* |                                                                                                  |
| 1)                                      | Visual examination                  | 8.4.1                                              | —                                                             | There shall be no damage.                                                                        |
| 2)                                      | Capacitance                         | 8.3.2                                              | —                                                             | The change in capacitance shall not be greater than $\pm 2$ percent.                             |
| 3)                                      | Tangent of loss angle               | 8.3.3                                              | —                                                             | As per the initial limits.                                                                       |
| e)                                      | Climatic sequence                   | 8.5.1                                              | 7.5.1 of<br>IS : 7305<br>( Part 1 )-1973†                     |                                                                                                  |
| 1)                                      | Dry heat test                       | —                                                  | At maximum category temperature                               | Insulation resistance shall be not less than 25 percent of the limits specified.                 |
| 2)                                      | Damp heat (accelerated) first cycle | —                                                  | One cycle<br>24 hours                                         | —                                                                                                |

\*IS : 9000 Basic environmental testing procedures for electronic and electrical items:

Part 15 Sealing tests,

Sec 3 Container sealing, gas leakage

Part 19 Test for robustness of terminations and integral mounting devices

Sec 1 Tensile test

Sec 2 Thrust test

Sec 3 Bending test

Sec 4 Torsion test

Part 8 Vibration

Part 18 Solderability test

Part 7 Impact test

Sec 2 Bump.

†Fixed capacitors used in electronic equipment : Part 1 General requirements and tests.

( Continued )

TABLE 2 TEST SCHEDULE AND REQUIREMENTS — *Contd.*

| Sl No. | Test                                        | Clause Ref in IS : 3723 (Part I) - 1978 | Condition of Test                       | Requirement                                                                         |
|--------|---------------------------------------------|-----------------------------------------|-----------------------------------------|-------------------------------------------------------------------------------------|
| (1)    | (2)                                         | (3)                                     | (4)                                     | (5)                                                                                 |
|        | 3) Cold test                                | —                                       | 2 hours at minimum category temperature | —                                                                                   |
|        | 4) Damp Heat (Accelerated) remaining cycles | —                                       | —                                       | —                                                                                   |
|        | <i>Final Measurements</i>                   |                                         |                                         |                                                                                     |
|        | i) Visual examination                       | 8.4.1                                   | —                                       | There shall be no damage.                                                           |
|        | ii) Voltage proof test                      | 8.3.1                                   | —                                       | There shall be no breakdown or flash-over.                                          |
|        | iii) Insulation resistance                  | 8.3.4                                   | —                                       | Shall be not less than 50 percent of the initial limits.                            |
|        | iv) Capacitance value                       | 8.3.2                                   | —                                       | The change in capacitance shall not exceed $\pm 5$ percent.                         |
|        | v) Tangent of loss angle                    | 8.3.3                                   | —                                       | Shall not be greater than 0.012.                                                    |
|        | <i>iii) Second Group</i>                    |                                         |                                         |                                                                                     |
|        | a) Damp heat (long term)                    | 8.5.2                                   | —                                       | —                                                                                   |
|        | <i>Final Measurements</i>                   |                                         |                                         |                                                                                     |
|        | 1) Visual examination                       | 8.4.1                                   | —                                       | There shall be no damage.                                                           |
|        | 2) Voltage proof test                       | 8.3.1                                   | —                                       | There shall be no breakdown or flashover.                                           |
|        | 3) Insulation resistance                    | 8.3.4                                   | —                                       | Shall not be less than 50 percent of the initial limits.                            |
|        | 4) Capacitance value                        | 8.3.2                                   | —                                       | The change in capacitance value shall not exceed $\pm 5$ percent.                   |
|        | 5) Tangent of loss angle                    | 8.3.3                                   | —                                       | Shall be not greater than 0.012.                                                    |
|        | <i>iv) Third Group</i>                      |                                         |                                         |                                                                                     |
|        | a) Endurance                                | 8.6.2                                   | 1 000 hrs                               | —                                                                                   |
|        | <i>Final Measurements</i>                   |                                         |                                         |                                                                                     |
|        | 1) Visual examination                       | 8.4.1                                   | —                                       | There shall be no damage.                                                           |
|        | 2) Voltage proof test                       | 8.3.1                                   | —                                       | There shall be no breakdown or flash-over.                                          |
|        | 3) Insulation resistance                    | 8.3.4                                   | —                                       | Shall be not less than 50 percent of the initial limits.                            |
|        | 4) Capacitance value                        | 8.3.2                                   | —                                       | The change in capacitance value shall not exceed $\pm 5$ percent.                   |
|        | 5) Tangent of loss angle                    | 8.3.3                                   | —                                       | Shall not be greater than 0.012.                                                    |
|        | <i>v) Fourth Group</i>                      |                                         |                                         |                                                                                     |
|        | Mould growth                                | 8.5.4                                   | As per IS:9000 (Part 10)-1979*          | There shall not be any mould growth visible.                                        |
|        | <i>vi) Fifth Group</i>                      |                                         |                                         |                                                                                     |
|        | a) Resistance to solvents                   | 8.6.5                                   | As per IS : 9000 (Part 20)-1979*        | The marking shall not be erased and the body of the capacitor shall not be damaged. |
|        | b) Resistance to soldering heat             | 8.4.4.2                                 | —                                       | The capacitance value shall not change more than $\pm 2$ percent.                   |
|        | <i>vii) Sixth Group</i>                     |                                         |                                         |                                                                                     |
|        | a) Radio frequency characteristics          | 8.6.4                                   | —                                       | Under consideration.                                                                |

\*IS : 9000 Basic environmental testing procedures for electronic and electrical items :

Part 10 Mould growth test.

Part 20 Resistance to cleaning solvent and permanence of markings.